

### REMARKS

Claims 6 and 47-63 are pending. Claims 1, 2, 4, 5, 8-10, 12-30, 41-44 and 46 have been cancelled herein, without prejudice or disclaimer of the subject matter presented therein. Claims 47-63 have been added.

Claim 6 is the only independent claim remaining. The Office Action did not explicitly reject that claim, but nonetheless addressed it in the context of the second rejection set out below.

Claims 1-3, 12, 13, 16, 18-21, 23, and 25-30 were rejected under 35 U.S.C. 103(a) as being unpatentable over *Lau et al.* ("Field Emission from Metal-Containing Amorphous Carbon Composite Films", *Diamond and Related Materials*, Vol. 10, pp. 1727-1731) in view of International Publication No. WO 99/28939 (*Tuck et al.*).

Claim 3 was canceled previously and thus the rejection of that claim is moot.

Without conceding the propriety of the rejection of Claims 12, 13, 16, 18-21, 23, and 25-30, those claims have been canceled herein, thereby rendering their rejections moot.

Claims 4, 14, 15, 22, 24, 5-11, 17, and 41-46 were rejected under 35 U.S.C. 103(a) as being unpatentable over *Lau et al.*, *Tuck et al.* and U.S. Patent 5,986,857 (*Hirano et al.*). Claims 7, 11, and 45 were canceled previously.

Without conceding the propriety of the rejection of Claims 4, 14, 15, 22, 24, 5, 7, 8-10, 17, 41-44, and 46, those claims have been canceled herein, thereby rendering their rejections moot.

Independent Claim 6 recites:

6. An electron-emitting device comprising:  
a cathode electrode; and  
a layer connected to the cathode electrode, wherein  
a plurality of groups of particles, each group being constituted by at least two particles which comprise metal as a main component and are adjacent to each other, are arranged in the layer,  
the layer comprises as a main component a material which has resistivity higher than resistivity of the particles,  
the adjacent two particles are arranged in a range of 5 nm or less, and  
one of the adjacent two particles is arranged to be nearer to the cathode electrode than the other particle.

The Office Action on page 9 states as follows:

Lau et al disclose in at least sections 1,2 a layer containing carbon (C) as a main component wherein a plurality of groups of particles (Co, Al, Ti) which are constituted by at least two particles which comprise metal selected from Co, Ni, and Fe as a main component, and are arranged in the layer; each of the particles comprises as a main component a material which has resistivity lower than resistivity of a material of the layer, graphene being arranged between adjacent particles. While Lau et al. do not disclose the layer containing 1 atm% or more and 20 atm% or less with respect to a carbon element, the optimization or parameters, absent evidence to the contrary, has been held to be obvious to one of ordinary skill in the art at the time of the invention.

However, Applicants respectfully disagree with the foregoing assertion for the following reasons.

Lau discloses an amorphous carbon film (e.g., a C:Co film) containing metal, but is silent as to whether the carbon film contains a metal particle or not. That is, disclosed in Lau is only that the amorphous carbon film contains the metal. However, Lau does not disclose or suggest that the contained metal is in a particle configuration. Lau states that by introducing metal, it is expected that more doubly bonded carbon clusters or even metal clusters may be created in the films at the expense of the number of sp<sup>3</sup> nbonds. However, this description refers merely to an expectation that such a metal cluster exists therein, but does not disclose or suggest that a metal particle exists in the amorphous carbon film.

Accordingly, the above assertion by the Office Action that Lau discloses the plurality of groups of the particles is incorrect.

The Office Action concedes that Lau “do[es] not disclose the arrangement of the particles or the emitting device, nor the hydrogen content”, but then argues as follows:

Tuck et al. do disclose in pages 7, 10 and figure 8, 2b, 10a an analogous layer (19) formed on a cathode (18) of an emitter device having a light emitting member (68) wherein the adjacent two particles are arranged in a range of 5 nm or less; one of the adjacent two particles is arranged to be nearer to the cathode electrode (18) than the other particle; and the plurality of groups of particles (231) are arranged apart from each other by an average film thickness of the layer or more, providing a display device. It would have been obvious to one of ordinary skill in the art at the time of the invention to combine the features of Lau et al. with those of Tuck et al. in order to provide a display device.

However, this assertion also is respectfully disagreed with, because Tuck is not seen to teach or suggest that one of the adjacent two particles is arranged to be nearer to the cathode electrode than the other particle, as set forth in Claim 6.

Referring to Fig. 7 of Tuck, for example, a size and a shape of the particle, and a size and material of an insulating layer, are disclosed. However, Tuck is completely silent as to the feature that one of the adjacent two particles is arranged to be nearer to the cathode electrode than the other particle, as recited in Claim 6.

Fig. 2 of Tuck discloses that a plurality of electroconductive particles 231 are arranged on the electroconductive substrate 230. However, all of the electroconductive particles 231 contact a surface of the flat electroconductive substrate 230. This means that Fig. 2 of Tuck fails to show or suggest a configuration in which one of the adjacent two particles is arranged to be nearer to the cathode electrode than the other particle, as set forth in Claim 6.

Moreover, Figs. 8 and 10 of Tuck also fail to depict or suggest a configuration in which one of the adjacent two particles is arranged to be nearer to the cathode electrode than the other particle, as set forth in Claim 6.

Indeed, nothing in either Lau et al. or Tuck et al., would teach or suggest the above-emphasized recitations of Claim 6. As such, Claim 6 is clearly patentable over those references, whether considered separately or in combination.

A review of the other art of record, including Hirano, has failed to reveal anything which, in Applicants' view, is understood to remedy the above-noted deficiencies of the mentioned art, as references against Claim 6 herein. Accordingly, that claims is believed patentable over the art of record.

The other claims depend from Claim 6, and also are believed to be clearly patentable for the same reasons as is that independent claim. Since each dependent claim is also deemed to recite an additional aspect of the invention, however, the individual consideration of each on its own merits is respectfully requested.

In view of the foregoing amendments and remarks, Applicants respectfully request early and favorable consideration and passage to issue of this application.

Applicants' undersigned attorney may be reached in our New York office by telephone at (212) 218-2100. All correspondence should continue to be directed to our below listed address.

Respectfully submitted,



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Frank A. DeLucia  
Attorney for Applicants  
Registration No. 42,476

FITZPATRICK, CELLA, HARPER & SCINTO  
30 Rockefeller Plaza  
New York, New York 10112-3801  
Facsimile: (212) 218-2200